

Lyme, NH – Thetford, VT 14460
East Thetford Road Bridge Rehabilitation
Public Informational Meeting
October 22, 2015



East Thetford Road (VT 113) over Connecticut River



Meeting Agenda

Welcome & Introductions

Tonight's Presentation:

- Recap and project update
- Preliminary details of Preferred Alternative based on input received so far from the Public and Natural Resource Agencies, and Historic Resource Agencies
- Next steps

E. Thetford Road (VT 113) Bridge Site Photos



Downstream Elevation – Taken from NH Bank

Site Photos – E. Thetford, Vermont



West Approach
Looking Easterly Toward NH



Bridge Placard
SW End Post

Site Photos - Lyme, New Hampshire



East Approach
Looking Westerly Toward Vermont

Site Photos - Lyme, New Hampshire



NE Quadrant
Toll House
Eligible for National Historic Register

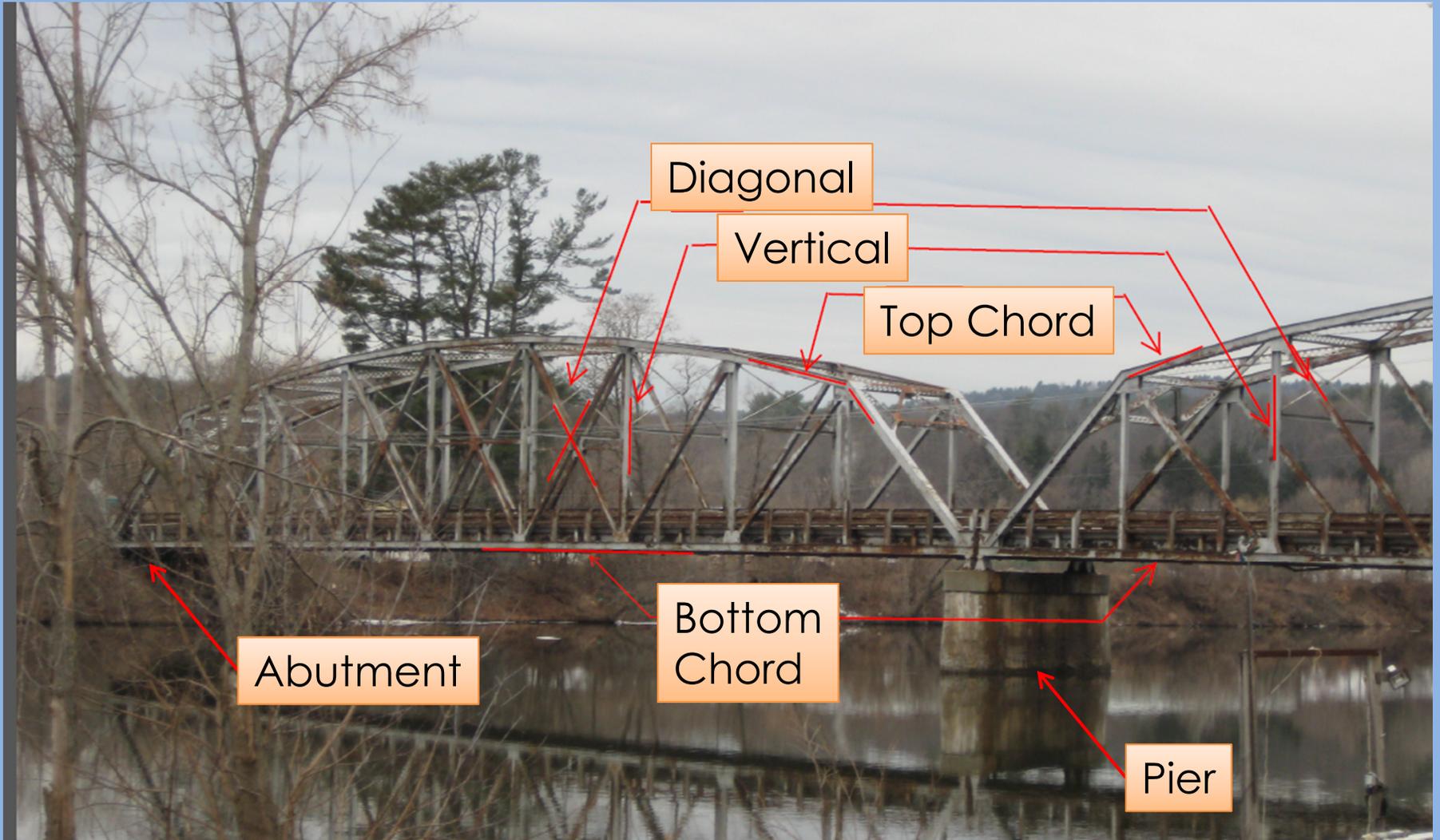


NE Quadrant
Looking Northerly

About the Bridge

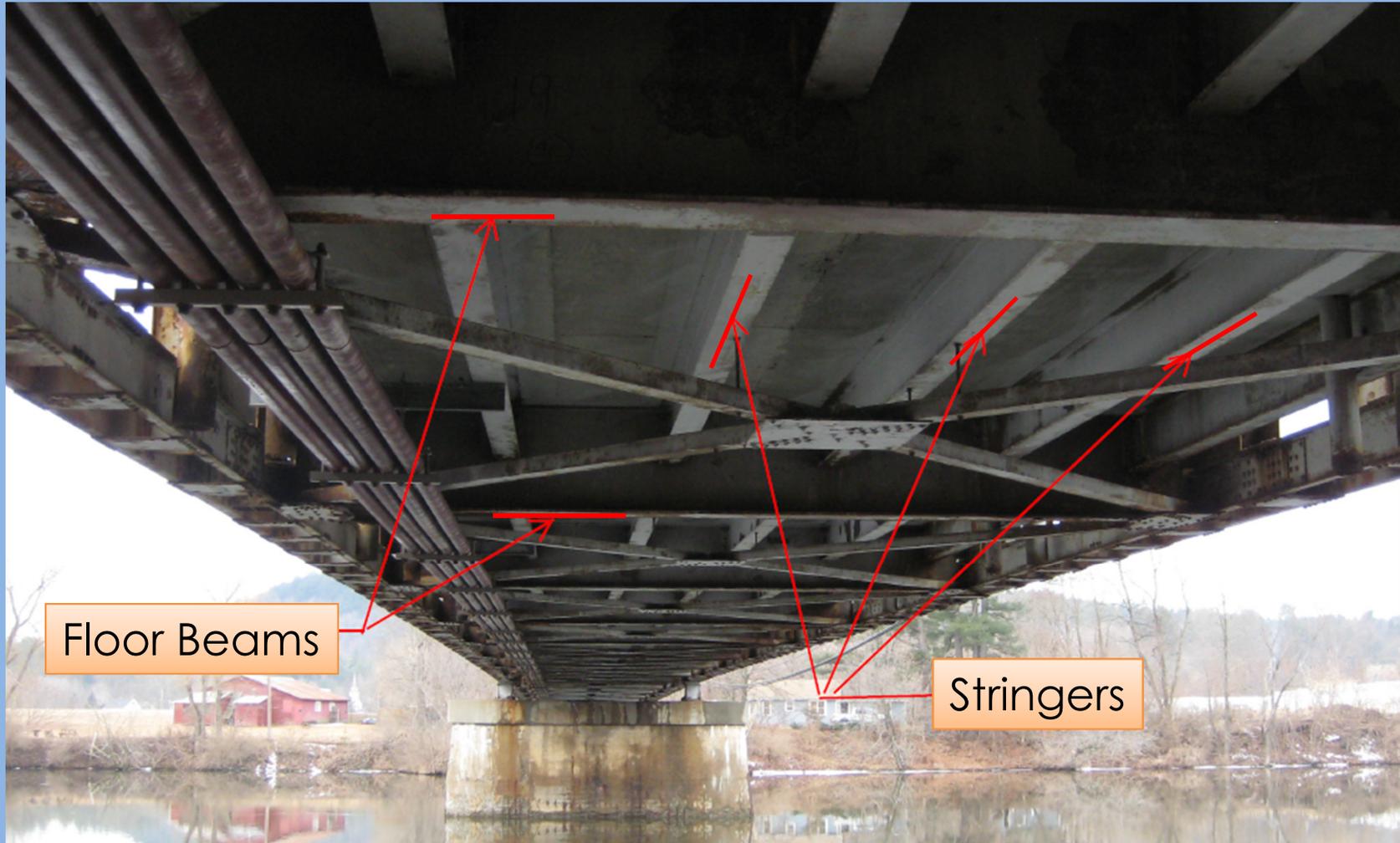
- Through-truss (Parker) bridge built in 1937
- Eligible for National Historic Register
- Consists of two 230 foot spans
- Bridge roadway is narrow at 21 feet between curbs
- Bridge is on NHDOT Red List (since 2013)
- NHDOT Bridge Priority number #63 (2015)
- Carries approximately 2100 vehicles per day
- Current 15 ton load posting. *NHDOT Forces made repairs in fall of 2014, but posting remains due to overall poor condition of the floor system*

Truss Bridge Nomenclature



Elevation View of Bridge Trusses

Truss Bridge Nomenclature



Floor Beams

Stringers

Floor System - View of Underside of Bridge Roadway

Tasks Completed to Date

Initial Investigations to Help Determine Scope of Work:

- In-depth structural inspection of all bridge components in September – October 2013
- Underwater inspection, and concrete sampling and testing of pier in August – October 2013
- Load rating analysis of the structure was completed in May 2014

Tasks Completed to Date

Received Input From Agencies and Interested Parties:

- Public Information Meeting in Lyme, NH on July 23, 2014
- Cultural Resource Agency Meetings on August 14, 2014, April 30, 2015, and September 10, 2015
- Natural Resource Agency Meeting on March 19, 2014

Inspection Photos



Steel Bridge Rail and Curb Deterioration



Existing Bridge Rail and Curb are in Poor Condition, Substandard, and Must Be Replaced

Stringer Deterioration



Many Existing Stringers & End Floor Beams are in Serious Condition and Must Be Replaced

Stringer Deterioration



Connection of Stringer to Floor Beam
Span 1 Stringer 1 West Face of Floor Beam 0
Has Since Been Repaired by NHDOT Forces - Fall 2014

Pier – East Elevation



Extensive Cracking, Spalling Concrete and Exposed Reinforcing Steel
Concrete Core Samples Revealed ASR and Low Air Entrainment

Pier – Below Waterline



Spalling Concrete and Exposed Reinforcing Steel

Pier – Concrete Core Sample Test Results



Crack Extends at Least 8 Inches From Pier Surface



Loose Fragmented Concrete

Pier – Concrete Core Sample Test Results

Evaluation of the Concrete Core Samples Revealed:

- Cracking extends at least 8 inches in from the pier surface
- Concrete has low air entrainment making it susceptible to cracking due to freeze-thaw cycles
- Alkali silica reactivity (ASR) is present within the existing concrete aggregate. Aggregate exerts an expansive pressure causing failure of the concrete pier from within

Abutments



SW Quadrant
Vermont



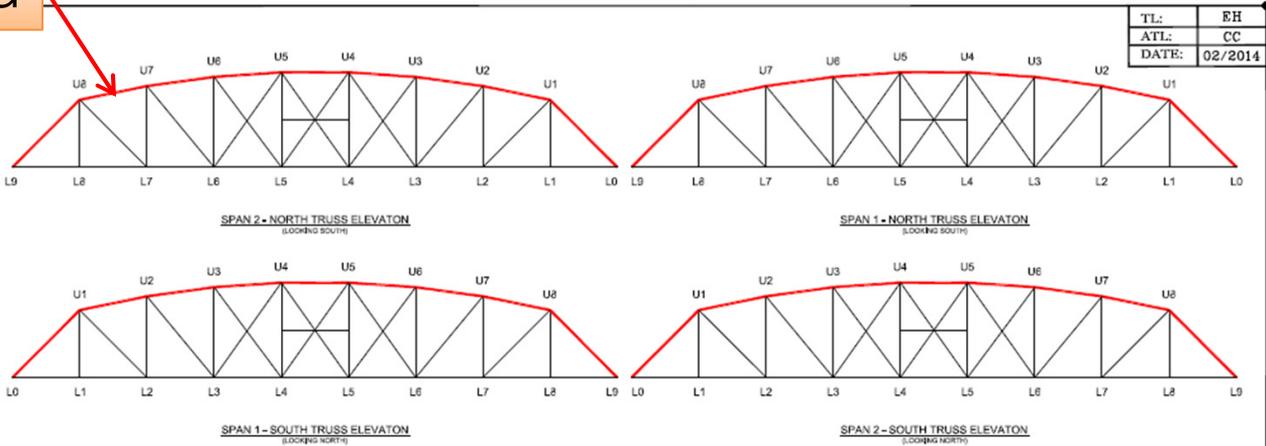
New Hampshire



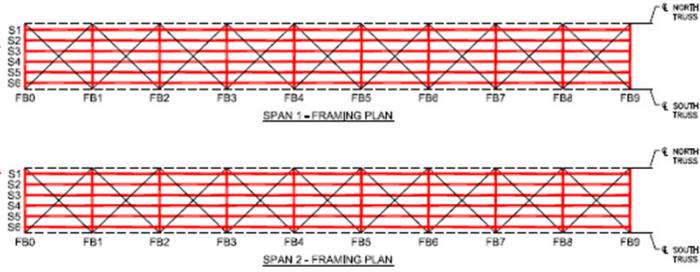
Spalling Concrete and Exposed Reinforcing Steel

Load Rating Analysis

Top Chord



Floor System Framing



LEGEND:
 = TRUSS MEMBER, FLOOR BEAM, OR STRINGER WITH A LOAD RATING LESS THAN 1.0

NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION		EAST THETFORD ROAD OVER CONNECTICUT RIVER LYME, NH - THETFORD, VT		SHEET NUMBER
PROJECT NO. 14460		LOAD RATING KEY- AS-INSPECTED (STRENGTH I - INVENTORY)		LR-3
14460	LYME 053/112			



Areas of Concern Identified by In-Depth Inspection and Load Rating Analysis

Preferred Alternative For Addressing the Deficient Bridge Is Rehabilitation

- Based on preliminary engineering studies and with input from the public and the resource agencies the Preferred Alternative is to rehabilitate the historic bridge
- This project will rehabilitate the bridge to carry full Legal Loads
- Make necessary safety improvements
- Look to minimize impacts to the character defining features of the original structure to the extent practicable

Summary

Anticipated Rehabilitation Effort

- Replace the pier
- Repair the abutments
- Replace portions of the floor system framing
- Replace concrete bridge deck (roadway)
- Replace the bridge railing and steel curb
- Clean and paint all steel truss components
- Includes limited approach roadway work as necessary to provide smooth transitions to the new bridge deck

Preliminary Details - Preferred Alternative

Pier:

- Due to the poor condition (extensive cracking and spalling concrete and the presence of ASR) the pier must be replaced.
- Replacement options being considered:
 - Replace pier in-kind (wall pier)
 - Replace with column and cap type pier

Preliminary Details - Preferred Alternative

Replace Pier In-Kind (\$1.0 M):

- The depth of water (approximately 15 feet) requires costly steel sheet pile cofferdams with concrete tremie seals
- Water level is deeper now than when previously constructed due to construction of dams downstream of the bridge (c.1950)

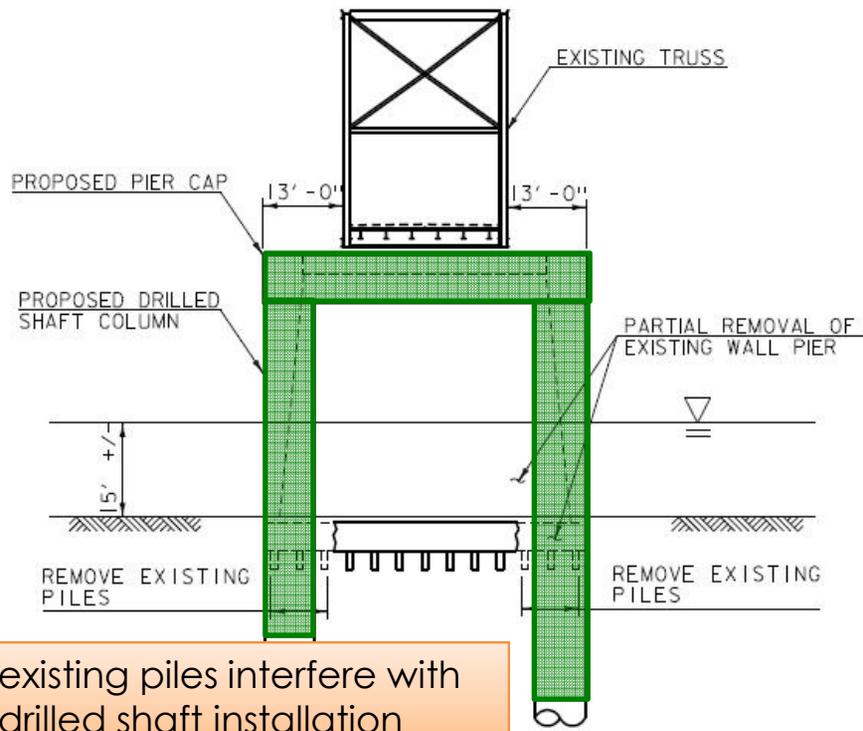
Two-Column Drilled Shafts & Cap (\$725 K – \$810 K):

- This option consists of concrete drilled shafts (columns) and a cap beam. The drilled shafts can be constructed without the need for cofferdams. Two drilled shaft layouts are being considered.

Preliminary Details - Preferred Alternative

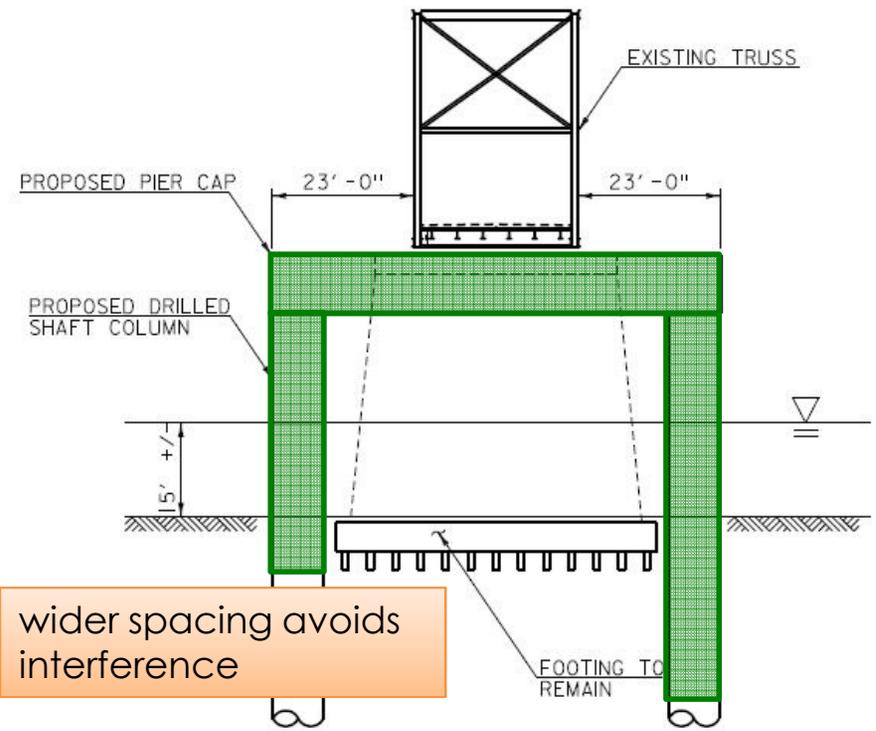
Pier Replacement with Drilled Shaft Columns & Cap

Narrow Spacing



Two Columns
Narrow Spacing (\$810 K)

Wider Spacing



Two Columns
Wider Spacing (\$725 K)

Preliminary Details - Alternative



Downstream Elevation Taken From Vermont Bank

Preliminary Details - Alternative



Drilled Shaft Pier Option 1 – Narrow Column Spacing

Rendering of Two-Column Pier
Downstream Elevation Taken From Vermont Bank

Preliminary Details - Preferred Alternative



Drilled Shaft Pier Option 2 – Wider Column Spacing

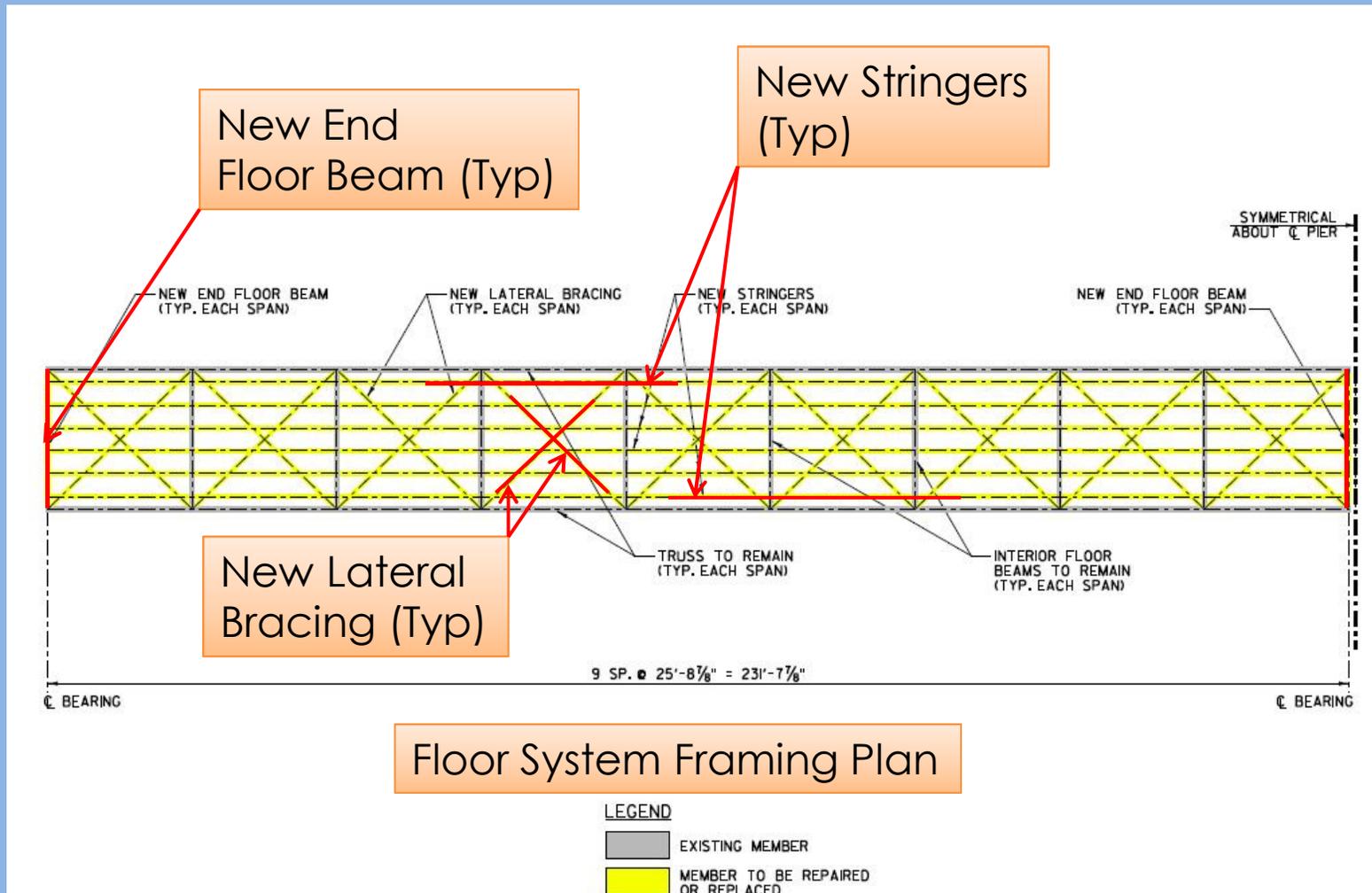
Rendering of Two-Column Pier
Downstream Elevation Taken From Vermont Bank

Preliminary Details - Preferred Alternative

Floor System Framing:

- Due to heavy rusting and section loss many components of the floor system framing must be replaced
- The recommended rehabilitation of the floor system framing consists of replacing the exterior steel stringers (possibly others) and lateral bracing, and the end floor beams (two each span)

Preliminary Details - Preferred Alternative



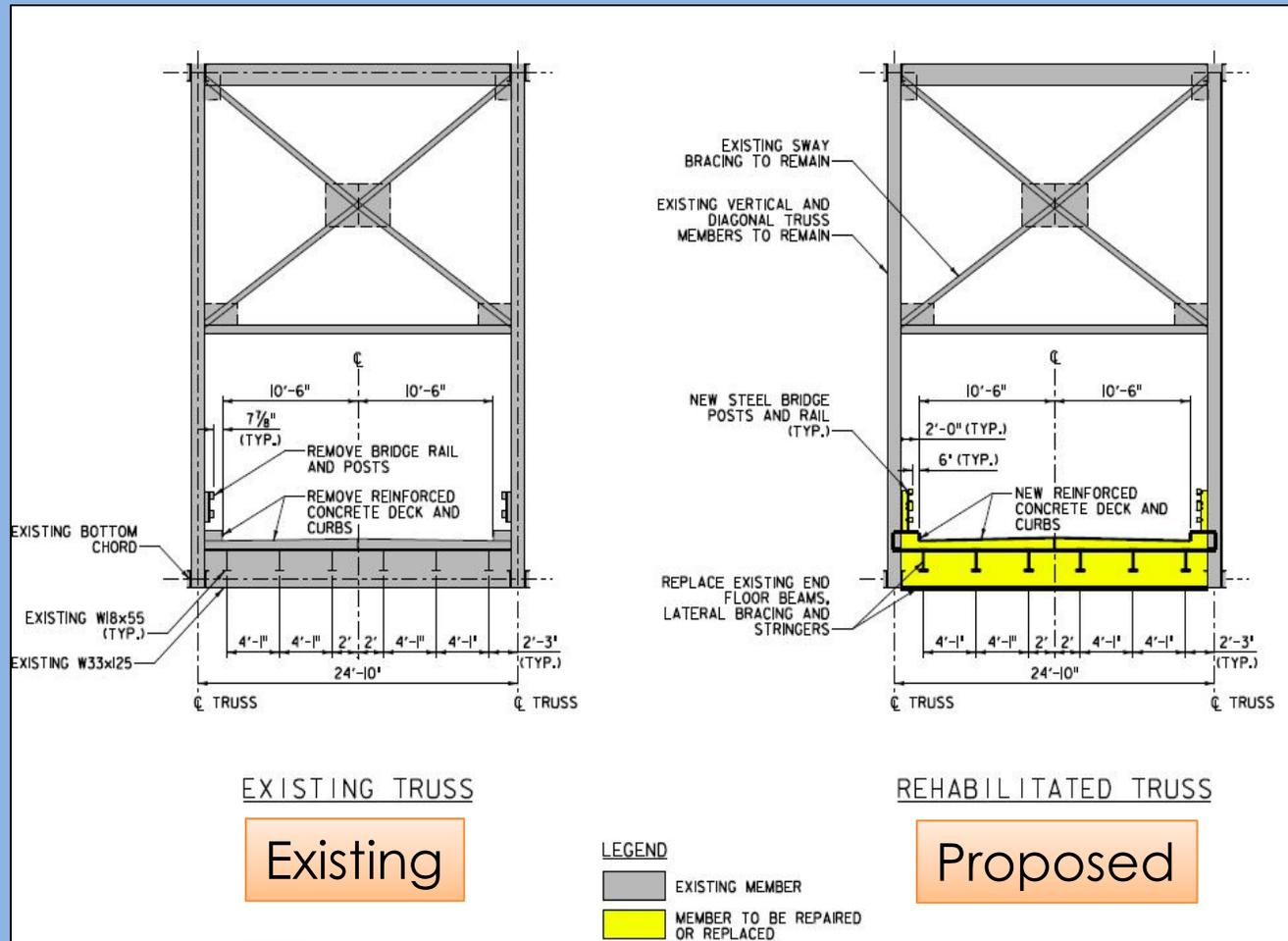
Plan of Floor System Framing for One Span
 Replace Steel Stringers, End Floor Beams and Lateral Bracing

Preliminary Details - Preferred Alternative

Concrete Bridge Deck:

- The existing concrete deck is in fair condition and dates to about 1979. It has a bituminous wearing surface (pavement). The additional weight of this pavement reduces the live load capacity of the bridge
- It is recommended to replace the deck with lighter weight concrete bare deck (no pavement). The reduction in weight eliminates the need to strengthen the existing truss components to achieve the required live load capacity
- The proposed deck will include stainless steel reinforcing to provide the longest service life

Preliminary Details - Preferred Alternative



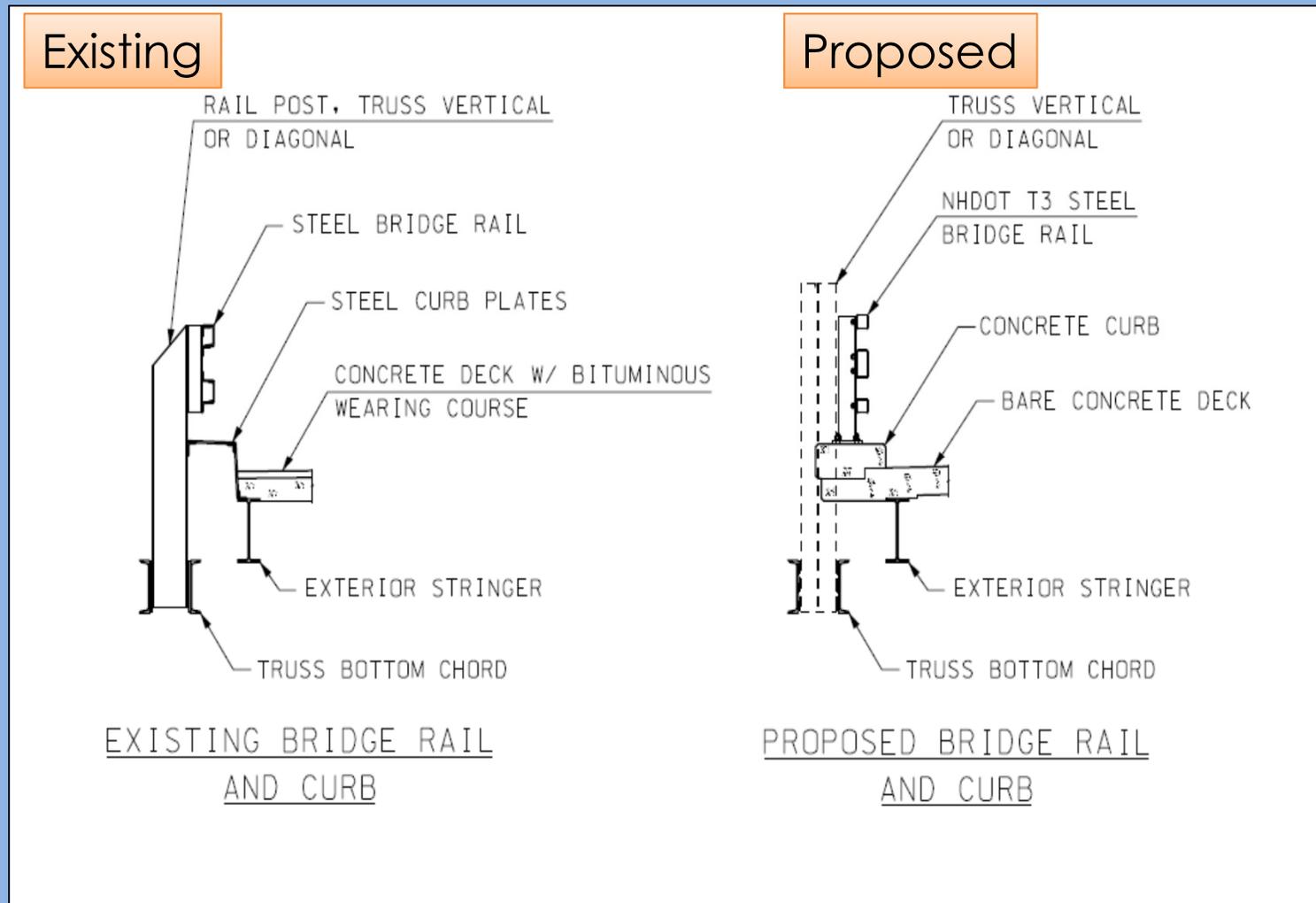
Existing & Proposed Floor System Details
 Width Between Curbs Remains at 21 feet

Preliminary Details - Preferred Alternative

Bridge Railing and Steel Curb:

- The existing steel bridge rail and curb plates are in poor condition and must be replaced
- The existing bridge rail is not crash tested and does not meet current safety requirements. The design also promotes pack rust that increases maintenance costs
- The recommended bridge rail system is NHDOT T3 steel rail with posts anchored directly to concrete curbs. This rail system has been crash tested and approved by the Federal Highway Administration
- Provide proper approach railing transitions at the four corners of the bridge

Preliminary Details - Preferred Alternative



Existing & Proposed Details at Curb Line of Bridge
Bridge Rail Upgraded to NHDOT T3 Steel Railing on Concrete Curb

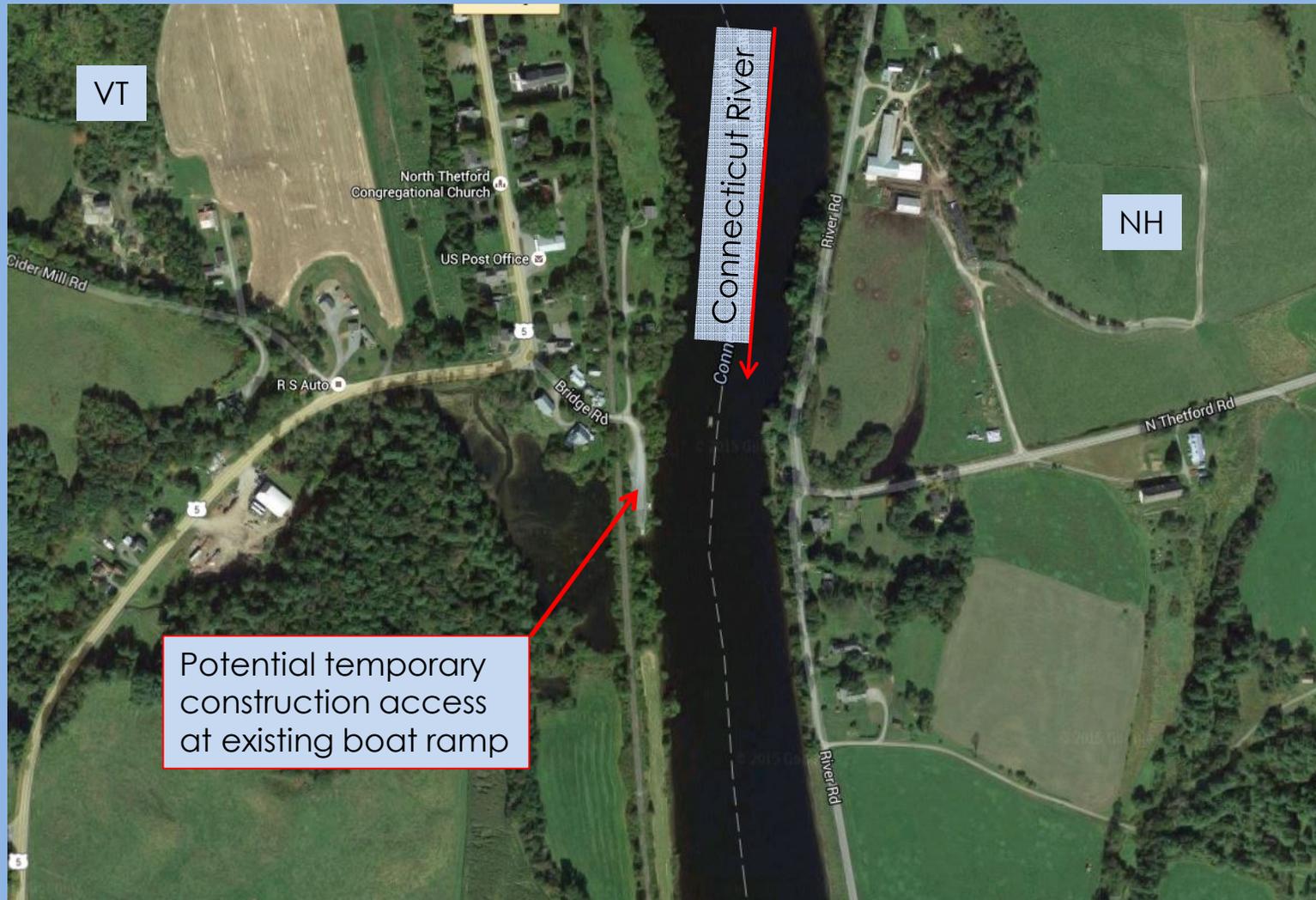
Preliminary Details - Preferred Alternative

Example – Bridge Painting Containment



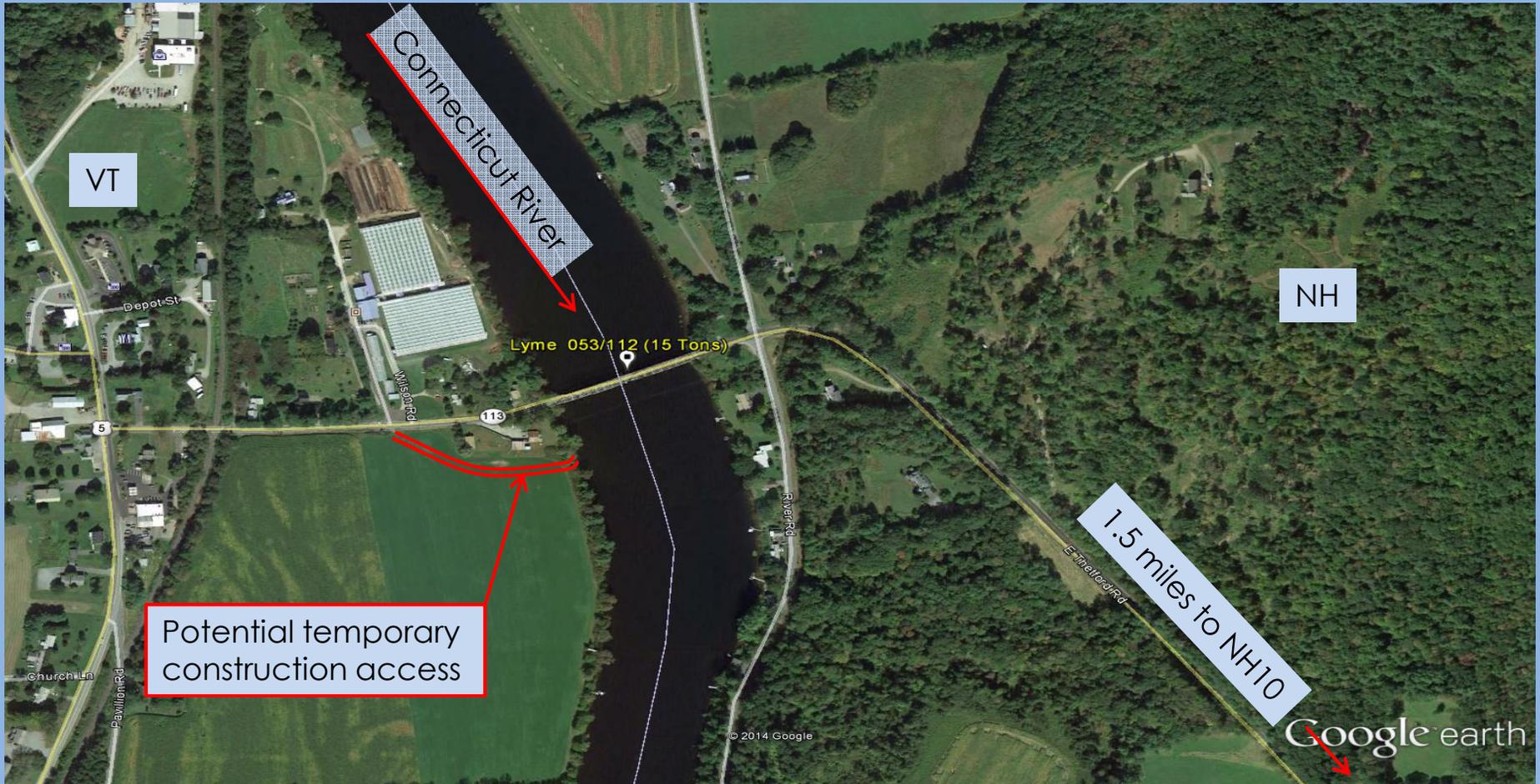
Example - Bridge Painting Operation
with Full Lead Paint Pollution Controls and Containment

Construction Access to the River is Required



Aerial View Showing a Potential Point of River Access at Boat Ramp Located Approximately 2.2 miles Upstream in Vermont

Construction Access to the River is Required

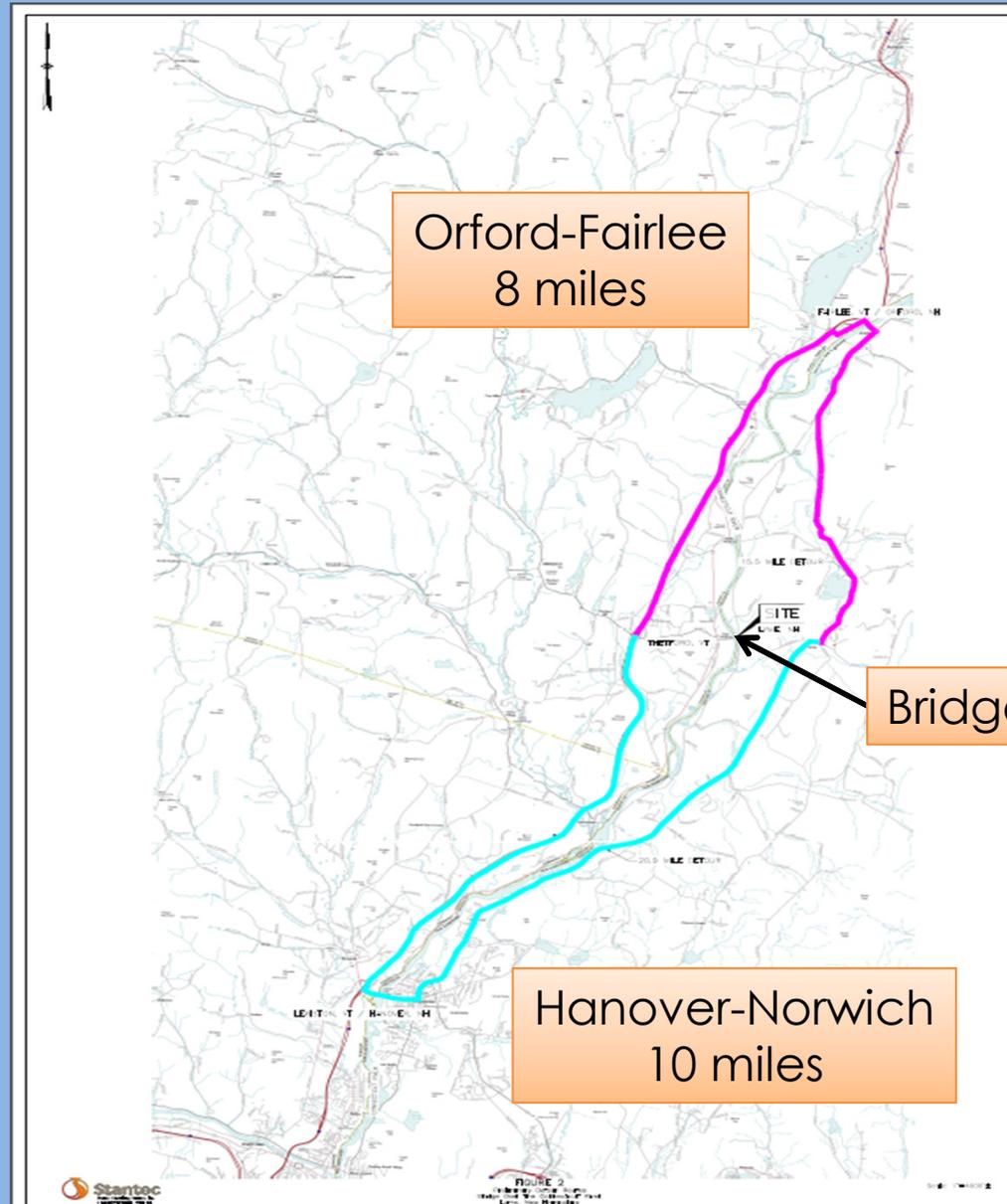


Aerial View of Site Showing a Potential Point of River Access at SW Quadrant Outside of Right-of-Way and Requires an Agreement with Property Owner

Anticipated Construction Duration & Traffic Control

- Two and half construction seasons are anticipated to complete the proposed rehabilitation work due to its complexity. The bridge must be closed during the rehabilitation work of the first full season and during the painting operation of the second season
- **Initial half season:** no impacts to traffic - work from river to construct drilled shafts for new pier and temporary supports for trusses
- **First full season:** close bridge in spring - support the trusses on temporary supports and replace pier; then complete the structural rehabilitation work (floor system framing, bridge deck, etc.)
- Temporarily reopen the bridge during winter after the first full construction season
- **Second season:** close bridge in spring - clean and paint all steel truss components (full lead paint containment); complete work and reopen bridge

Traffic Control Detour Routes



Next Steps

- Continue coordination with Cultural and Natural Resource Agencies
- Review constructability, construction time frames and access to site for bridge construction
- Take borings in the river to assist with the design of the new pier foundation
- Complete NEPA process (National Environmental Policy Act) for environmental permitting
- Develop preliminary plans
- Develop contract plans and documents

Cultural Resources

1937 Two-Span Parker Truss

1 of only 3 Remaining in NH



Downstream Elevation – Taken from NH Bank

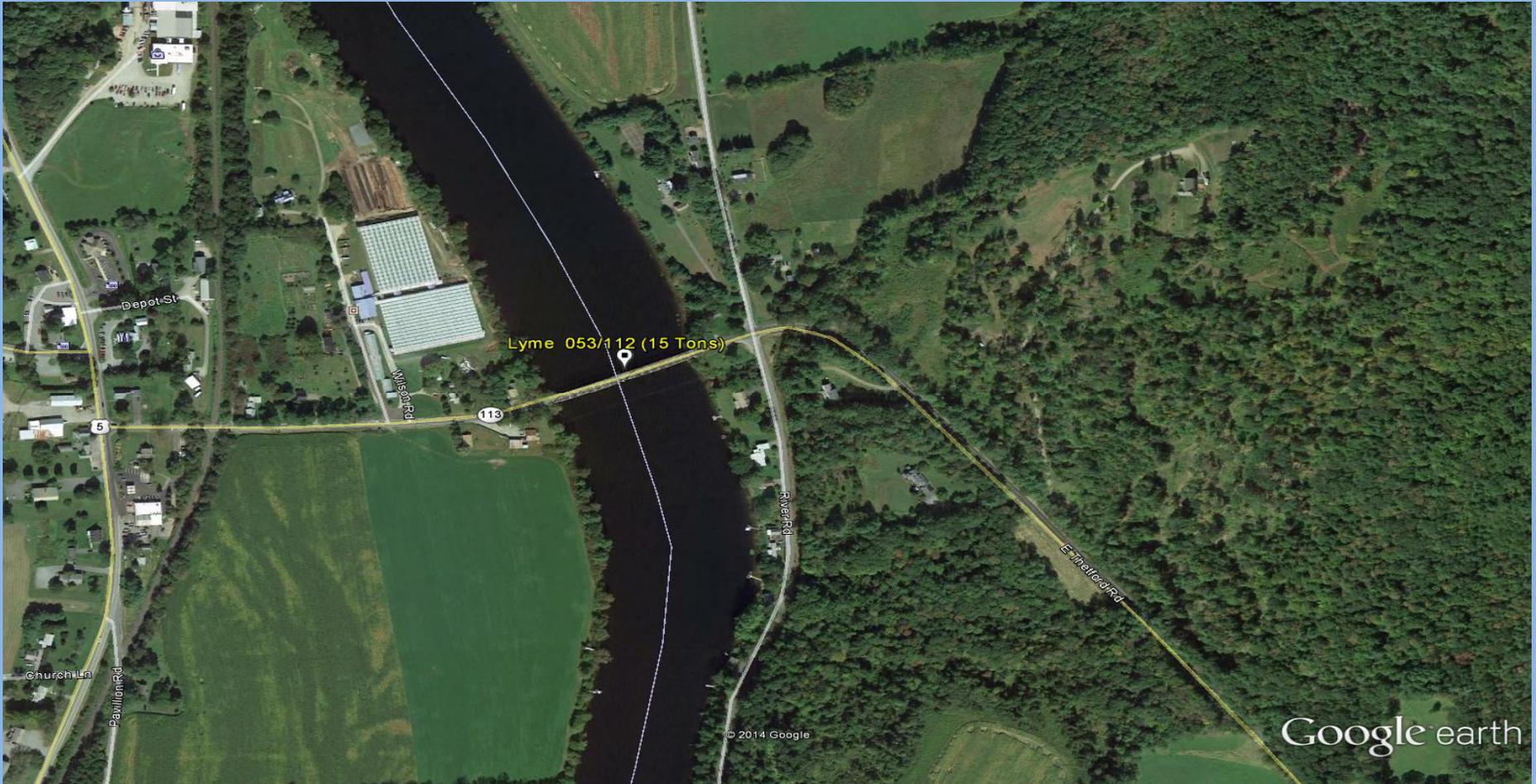
Cultural Resources – Historic Properties

- Project information reported to FHWA, NHDHR and VT DHP for technical review and consultation, and to make a *Determination of Effect*
- If the project is found to have an *Adverse Effect* on historic properties, identify ways to minimize or mitigate the adverse effects
- Interested persons or organizations may request “*Consulting Party*” status from FHWA
Contact Jamie Sikora, 603-401-4870 or jamie.sikora@fhwa.dot.gov

Natural Resources

Connecticut River - NH Designated River

Dwarf Wedge Mussel - Federally Endangered



Aerial View of Site

Next Steps from Cultural and Natural Resources

- Continue to investigate if additional resources exist in the project area including potential staging and access areas (*please bring any concerns to our attention*)

Permitting and Approvals

- NHDES Wetland Permit
- NHDES Shoreland Notification
- Vermont Stream Alteration
- Army Corps PGP
- United States Coast Guard Bridge Permit

Schedule

- Contract plans completed Fall 2019
- Funding in fiscal year 2022 (Draft Ten-Year Plan)
- Construction starts in fall of 2022 with project completion in the fall of 2024
- Estimated construction cost to rehabilitate the bridge is \$4.5 Million (funding is States & Federal - no Town funding for Thetford or Lyme)

Thank You

- - -

Comments & Questions



East Thetford Road Bridge c.1937